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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/129,113	08/04/1998	JAMES F. CAMERON	50349	4003

7590

05/06/2002

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EXAMINER

GILMORE, BARBARA L

ART UNIT

PAPER NUMBER

1752

16

DATE MAILED: 05/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/129,113

Applicant(s)

CAMERON ET AL.

Examiner

Barbara Gilmore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on CPA filed 3/8/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 and 31-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 31-42 is/are rejected.
- 7) ☒ Claim(s) 1-24,31,32,34,35 and 37-39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Prosecution Application

1. The request filed on March 8, 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/129,113 is acceptable and a CPA has been established. An action on the CPA follows.
2. Claims 1-26 and 31-42 are pending.

Claim Objections

3. Claim 22 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

- a. Claim 1 has been amended to include the limitations of claim 22. Please cancel claim 22.

4. Claims 1-24, 31-32, 34-35 and 37-39 are objected to because of the following informalities: In line 7 of claims 1 and 37 appears "heteroalkynyl" which should be heteroalkynyl. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-11, 17, 19-26, 31-36, 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsawa et al.

a. In US Patent No. 5,847,218, Ohsawa et al teach a chemically amplified positive resist composition comprising an organic solvent, an alkali soluble resin and a sulfonium salt having an arylsulfonate anion wherein each of the substituents of the sulfonium salt is a substituted or unsubstituted aromatic group (claims 1 and 4). Examples of the substituted or unsubstituted aromatic group include phenyl, alkoxyphenyl groups and alkylphenyl groups with alkylphenyl groups comprising 1 to 8 carbon atoms are exemplary (column 5, lines 23-57). The substituted aromatic groups may have a substituent at any of the o-, m- and p- positions. The p- substituted aromatic groups have high molecular crystallinity or symmetry (column 6, lines 20-26). The aryl sulfonate may be substituted with a hydrogen atom, an alkyl group or an alkoxy group. The alkyl groups are preferably normal and branched alkyl groups having 1 to 12 carbon atoms and the alkoxy groups are preferably those having 1 to 8 carbon atoms (column 6, lines 27-37). An example of the sulfonium salt and sulfonate anion is given in formula (1c) (column 15, lines 11-23). The sulfonium salt of Ohsawa et al meets the present limitations for the sulfonium photoacid generator of the present application. Examples of the alkali soluble resin include polyhydroxystyrene and derivatives thereof. Preferred are those polyhydroxystyrene derivatives wherein hydrogen atoms of some

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OH groups of polyhydroxystyrene are replaced by acid labile groups (column 16, lines 32-45). The alkali soluble polyhydroxystyrene resin wherein some of the OH groups are replaced by acid labile groups meet the present limitations for a component that comprises photoacid-labile groups. In column 27, lines 30-34, Ohsawa et al teach coating the composition of examples 1-15 onto a silicon wafer using a suitable solvent including propylene glycol monomethyl ether acetate (column 16, lines 25-26).

Propylene glycol monomethyl ether acetate meets the present limitations for a non-hydroxylic solvent.

b. Therefore it would have been *prima facie* obvious to one of ordinary skill in the photosensitive art to coat a silicon wafer with a chemically amplified positive resist solution comprising an alkali soluble resin with acid labile groups, a sulfonium salt having an arylsulfonate anion and propylene glycol methyl ether acetate with reasonable expectation of obtaining a chemically amplified positive resist composition with high resolution based on the teachings of Ohsawa et al (column 3, lines 42-49).

7. Claims 1-26 and 31-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinta et al.

a. In U.S. Patent No. 5,731,364, Sinta et al teach a photoresist composition comprising a resin binder and a photoactive component, the photoactive component comprises a plurality of distinct aryl sulfonium photoactivatable compounds (claim 1). The photoactive cation is preferably a di-cation compound, particularly compound of formula VI wherein R is the same or different and is a substituted or unsubstituted aryl group and each Q is a sulfonate or carboxylate anion (column 3, lines 24-38). When

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substituted, the R groups are substituted at one or more available positions by halogens, alkyl groups, alkoxy groups, alkenyl groups, aryl groups (column 5, lines 39-60).

Suitable counter ions are given in column 4, line 28 - column 6, line 51, which include benzylsulfonate, alkyl sulfonates such as mesylate, aryl tosylates and halogenated alkyl sulfonates such as triflate. The photoactive sulfonium compound meets the present limitations for the sulfonium photoacid generator. The resin binder has functional groups that impart alkaline aqueous developability to the resist composition. Preferable resin binders comprise polar functional groups such as hydroxyl or carboxylate (column 7, line 38 - 50). A substituted ester moiety, taught as a suitable acid labile group of the resin is described in column 9, lines 23-27. Preferred acid labile moieties are acetate groups including t-butyl acetate, acetals and ketals (column 9, lines 44 - 49). The resin binder comprising an acid labile group meets the present limitations for the component that comprises photoacid-labile groups. A resist can be prepared by dissolving the components of the photoresist in a suitable solvent such as propylene glycol monomethyl ether and lactates such as ethyl or methyl lactate (column 11, lines 10-26). Sinta et al further teach that the photoresists may be applied to a substrate in liquid form (column 11, lines 27-32). Propylene glycol monomethyl ether meets the present limitations for a non-hydroxylic solvent.

b. Therefore it would have been *prima facie* obvious to make a photosensitive composition comprising a binder resin with acid labile groups and a di-cation sulfonium photoacid generator comprising a sulfonate counter anion and to coat the composition on a microelectronic wafer using propylene glycol monomethyl ether acetate to obtain a photoresist with excellent lithographic properties that can be used in

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accordance with known procedures based on the teachings of Sinta et al (column 3, lines 38-42 & column 11, lines 27-41).

8. Claims 1-9, 15-17, 19-26, 31-41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoi et al.

a. In U.S. Patent No. 5,693,452, Aoi et al teach a positive chemically amplified resist composition comprising (a) a compound which generates an acid upon irradiation with active light or radiant ray, (b) a resin insoluble in water but soluble in an aqueous alkali solution, (c) a low molecular acid-decomposable dissolution inhibitor which increases its solubility in an alkali developer by the action of an acid and (d) a resin having an acid-decomposable alkyl ester group (abstract). The resin having an acid-decomposable alkyl ester group meets the present limitations for the component that comprises photoacid-labile groups and is described in column 42, line 22 - column 47, line 25. Sulfonium salts represented by formula PAG4 are particularly effective as compound (a). R³, R⁴ and R⁵ each independently represents a substituted or unsubstituted alkyl or aryl group, preferably an aryl group having from 6 to 14 carbon atoms, an alkyl group having from 1 to 8 carbon atoms or a substitution derivative thereof. Examples of the counter anion, Z⁻, include naphthalene-1-sulfonic acid ion (column 32, lines 29-63). The sulfonium salts meet the present limitations for the sulfonium photoacid generator. Examples of the solvent for dissolving the resist composition include propylene glycol methyl ether acetate (column 51, lines 4-19) which meets the present limitations for the non-hydroxylic solvent. The resist composition is

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coated on a substrate typically used in producing a precision integrated circuit element such as a silicon/silicon dioxide-covered substrate (column 53, lines 10-14).

b. Therefore it would have been *prima facie* obvious to one of ordinary skill in the photosensitive art to use propylene glycol methyl ether acetate to coat a radiation sensitive mixture comprising a sulfonium salt acid generator, an aqueous alkali soluble resin, a low molecular acid-decomposable dissolution inhibitor and a resin having an acid-decomposable alkyl ester group onto a typical substrate to obtain a resist with less metal impurities as by Aoai et al (column 3, lines 33-44).

Conclusion

9. This is a CPA of applicant's earlier Application No. 09/129,113. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

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advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Gilmore whose telephone number is 703-305-1330. The examiner can normally be reached on Monday through Thursday.

a. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

b. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



BG

May 2, 2002



ROSEMARY ASHTON
PRIMARY EXAMINER